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INFLATION

To what extent has our circulating medium been inflated since the beginning of the war in Europe; and what evils and what benefits have resulted from this inflation? The purpose of this paper is to throw some light upon these important and much controverted questions.

The term inflation as used in current discussions is given a variety of meanings, and much of the difference of opinion that exists on the subject is due to a confusion of terms. Without attempting to harmonize the various conflicting views, nor to give a precise and formal definition of inflation, we may note that there is one idea common to most uses of the word, namely the idea of a supply of circulating media in excess of trade needs. It is the idea of a redundancy of money or circulating credit or both, a redundancy that results in rising prices. This is the broad concept of inflation as the term is used in this paper. More specifically, inflation occurs when, *at a given price level*, a country's circulating media—cash and deposit currency—increase *relatively* to trade needs.

The first step in any examination of the subject of inflation, therefore, is to measure in some way the growth of trade needs. Can this be done? It cannot with any high degree of accuracy, but a rough approximation can probably be reached through the study of certain statistics which typify business activity and growth. Obviously the statistics used to measure business should not involve prices, for price fluctuations are themselves supposed to be in part the result of this inflation. The statistics used, therefore, as indices of business growth and activity should be expressed in units other than monetary units. The items chosen, moreover, should be important ones which are reasonable indices of either business activity and growth in general, or of business activity and growth in important branches of industry. Among the best items for measuring the movement of business in general, because they are items that enter into so many products, are the production of pig iron, bituminous coal, anthracite coal, petroleum, copper, and silver. Other good indices of general business

are the number of tons of freight carried on important railroads and the tonnage of vessels entered and cleared at American ports. Representative of agricultural industry is the production of wheat, corn, and cotton; and representative of the building industry is the number of building permits given in leading cities. Here are twelve items any one of which is an honest witness of the growth of American business, but each of which has its own bias. Safer than to trust any one of them is to take the testimony of all, so that in the mouths of many witnesses the truth may be established. If we reduce the figures for each of these twelve items to a percentage basis, taking as 100 the average figure for the five calendar years 1910-1914 inclusive, and if we then combine these percentage figures into a simple average we arrive at a series of index numbers, which should represent in a rough way the growth of business in general. Such computations give the result shown in the following table:

TABLE 1.—GROWTH OF BUSINESS 1910-1917¹

Year	Index Number
1910	93
1911	95
1912	102
1913	105
1914	104
1915	108
1916	113
1917	127

¹ In computing the items in the table given above the figure used for anthracite coal is that representing the number of tons carried to tide water. The figure for copper refers to refined output, including import of crude copper. The figures for building permits granted in certain cities cover 49 leading cities. They are the figures given in the *Statistical Abstract of the United States* for 1916, less the figures for Fall River, Providence, and Reading, cities for which data are not available for all years. Figures for 1917 were compiled from *Bradstreet's Review*. The index number covering the number of revenue tons of freight carried on railroads is based upon six representative railroads, the only ones for which figures for the period 1910-1916 were available for calendar years. This item is not included in the index for 1917, for the figures for 1917 are not yet available. The railroads included are: Cleveland, Cincinnati, Chicago & St. Louis Railroad; Delaware and Hudson Co.; Delaware, Lackawanna & Western Railroad; New York, Chicago and St. Louis Railroad; Pennsylvania Railroad, and Pittsburgh, Cincinnati, Chicago & St. Louis Railroad.

Irving Fisher publishes each year an index number of the volume of trade in his article on "The Equation of Exchange" for the year in this REVIEW. See also B. M. Anderson's "Index Numbers of Prices and Railroad Receipts" in *The Annalist*, Jan. 7, 1918, p. 3.

Aside from the slight decline in the year 1914 when the war broke out, the figures show a moderate growth of business each year from 1910 to 1916, and a pronounced growth in 1917. Comparing the year 1913, namely the last year before the war broke out, with 1917, we find a business growth of 21 per cent.

The above figures do not include any item representing directly the business of the stock market—a business which obviously makes a large and varying demand upon our circulating medium. There exists no good non-monetary index of the business on our stock exchanges, but the best one available is the number of shares traded on in the New York stock exchange. For the period in question, the index numbers for the number of shares traded in on the New York stock exchange are as follows:

TABLE 2.—INDEX OF SPECULATIVE TRANSACTIONS²

Year	Index Number
1910	130
1911	100
1912	104
1913	66
1914	38
1915	137
1916	184
1917	147

The figure for 1917 is 123 per cent higher than that for the exceptionally low year 1913, and is 7 per cent higher than that for 1915.

It is a debatable question how much weight should be given a stock exchange item of this kind in constructing an index number of the growth of business. Some would leave it out entirely on the ground that it is not fairly representative of speculative transactions, and that the wide variation it shows so distorts the story told by the other figures as to impair its usefulness. Others would give it a large importance in a study of inflation, because of the heavy demand stock trading makes upon our deposit currency. If we treat this item as of the same relative importance in the general index of business as pig iron produced, bituminous coal produced, or any of the other items above mentioned, and if

² The base period taken as 100 in computing these index numbers is the average for the 4 years 1910-1913, inclusive. In view of the fact that the New York stock exchange was closed for stock trading between July 31 and December 12, 1914, it was impracticable to include the year 1914 in computing the base, for its inclusion would have distorted the figures.

we incorporate it as one of thirteen items in the general index of the growth of business, that index becomes as follows:

TABLE 3.—INDEX OF THE GROWTH OF BUSINESS
(INCLUDING ITEM FOR SPECULATIVE TRANSACTION)

Year	Index Number
1910	96
1911	95
1912	102
1913	102
1914	99
1915	110
1916	119
1917	129

This index of the growth of business is much more irregular in its movement than the first one. It shows a business increase of 26 per cent since the pre-war year 1913, as compared with the 21 per cent shown by the index from which the item of stock exchange trading was omitted. The writer believes that the first index of the growth of business is the preferable one, but this second one is included for the use of any one who prefers it.

Money in Circulation

Having found evidence which shows in a rough way the relative movement of the volume of the country's business transactions during recent years, let us next inquire concerning the volume of money in circulation for the same period; namely, money outside of federal treasury vaults but exclusive of the money reserve held against federal reserve notes.³

³ In computing the total monetary circulation of the United States, the following plan has been used. In order to make the figures representative of the entire year, and render them comparable with those for the growth of business, we have taken for each year the average of the circulation figures for the four quarterly dates, beginning with that of March 31.

The circulation includes all kinds of money in the country, except that held in the federal treasury as assets of the government, and except that part of the cash held by the twelve federal reserve banks and the twelve federal reserve agents, that would represent the same percentage of cash reserve against outstanding federal reserve notes as the percentage held against deposits and notes combined. Only net circulation of federal reserve notes is therefore included in the circulation, but the net circulation is computed on the basis of allocating to the notes the same percentage of reserve as that represented by the percentage of cash reserve held by the federal reserve banks to deposits and outstanding notes combined. In this way the figures for the period before the federal reserve amendment of June 21, 1917, are made comparable with those after that date.

TABLE 4.—MONETARY CIRCULATION OF THE UNITED STATES

Year	Amount of money in circulation (<i>Millions</i>)	Index Number
1910	\$3154	95
1911	3238	98
1912	3304	100
1913	3390	102
1914	3505	106
1915	3682	111
1916	4159	125
1917	4914	148

This shows an increase in the total monetary circulation for 1917 of 45 per cent over that for 1913, while the volume of business in the same time increased 21 per cent if one excludes from the business index the item for number of shares sold on the New York stock exchange, and it increased 26 per cent if one includes that item. On either basis, therefore, the figures show that since the last year of peace the amount of money in circulation in the United States has increased very much more than the physical volume of business to be done.

Gold

In this connection it is interesting to note that the amount of gold used as money increased during this period even more than the total monetary circulation. In other words, of our total circulation the proportion consisting of gold was a rapidly increasing one. The growth of the gold circulation of the United States (inclusive of gold held by the federal reserve banks and of gold bars used in place of gold coin in monetary reserves) was as follows, using the average figures of the four quarterly dates for each year.⁴

TABLE 5.—CIRCULATION OF GOLD AND GOLD CERTIFICATES

Year	Amount (<i>Millions</i>)	Index Number
1910	\$1424	92
1911	1518	98
1912	1558	101
1913	1626	105
1914	1620	105
1915	1838	119
1916	2322	150
1917	2860	185

⁴ Gold held in the United States Treasury as an asset of the government is not included.

Here is an increase of about 76 per cent in the gold circulation since 1913, as compared with 45 per cent in the total circulation, and 21 per cent or 26 per cent in the growth of business, depending upon whether the item for shares sold on the New York stock exchange is excluded from the index of business growth or not.

Deposit Currency

The great bulk of the business of the United States—variously estimated from 75 per cent to 90 per cent—is effected not directly by means of cash, but by means of bank deposits which circulate through the instrumentality of bank checks. These check deposits are all payable in cash on demand, and, although they are supported by the other assets of the banks, their most direct and immediate support is the cash reserve. Deposits must be paid in cash when cash is demanded, and the other assets may be used for that purpose only when turned into cash. In its function of serving as bank reserves, money possesses its most efficient use. An active deposit account, of which the average daily balance is \$10,000 for the year, may perform several hundred thousand dollars' worth of exchange work within the year through the checks that will be drawn against it. If an average cash reserve of, say, \$2,000 or 20 per cent is held against this deposit (either entirely in the bank's own vault or partly in the bank's own vault and partly in the vaults of other banks), the dollar in reserve money, other things equal, is obviously only one half as efficient as it would be if the reserve needed for the same purpose were only \$1,000, or 10 per cent of the average daily balance.

Recent improvements in our banking system, growing out of the establishment of the federal reserve system and its subsequent development, have made our reserve money more efficient than it formerly was; in other words, have enabled a dollar in reserve to do more money work than before. This in effect is equivalent to increasing the supply of money.

In the light of this principle, let us examine the evidence available on the subject of the growth of cash reserves, and of bank deposits for the years 1910-1917.

Cash Reserves of Banks

In the examination of cash reserves, we shall concern ourselves not with legal reserves, but only with ultimate cash reserves: namely, cash on hand in individual commercial banks and in fed-

eral reserve banks, cash reserved as the currency support for individual and government deposits.

The reserve figures used in this paper cover the following items: (1) the average amount of cash in vaults of national banks for the dates of the five or six comptroller's calls each year, said cash being taken to include specie, legal tenders, fractional money, and bank notes of other banks;⁵ (2) the cash in vaults of state banks and loan and trust companies about July 1 of each year, as shown by the reports of the Comptroller of the Currency; (3) such a part of the cash reserve of the twelve federal reserve banks as is properly allocated to deposits as contrasted with federal reserve notes.⁶

The cash reserves against deposits of all commercial banks and of the twelve federal reserve banks for the years 1910-1917 computed in the manner above described were as follows:

TABLE 6.—CASH RESERVE AGAINST BANK DEPOSITS HELD BY NATIONAL BANKS, STATE BANKS, TRUST COMPANIES, AND FEDERAL RESERVE BANKS

Year	Amount (Millions)	Index Number
1910	\$1377	93
1911	1446	98
1912	1492	101
1913	1488	101
1914	1566	106
1915	1714	116
1916	1912	130
1917	2254	153

Comparing this growth with that of business and of the total monetary circulation, we find that from 1913 to 1917 cash reserves increased 51 per cent, and business 21 per cent or 26 per cent, according as one excludes or not from the business index the

⁵ The 5 per cent redemption fund deposited with the Treasurer of the United States, for the redemption of bank notes, although countable as part of a bank's legal reserve money against deposits prior to the inauguration of the federal reserve system, was in fact so essentially a redemption fund for bank notes that it has not been included in the cash reserve against deposits given below.

⁶ The basis of the apportionment is the assignment to deposits of that proportion of the total cash of the reserve banks (including that deposited as collateral with the federal reserve agents for federal reserve notes) which is represented by the ratio of the total deposit liability of the banks to the total deposit and federal reserve note liability. The figures for each year used in computing the federal reserve banks' reserve against deposits are the average figures for the four quarterly dates coming near the end of the four quarters beginning with the date of March 31 each year. See also note 3.

item of shares sold on the New York stock exchange, while the total monetary circulation increased 45 per cent. A slightly larger proportion of the currency of the country was therefore held in the vaults of banks in 1917 than in 1913.

TABLE 7.—PERCENTAGE OF CASH RESERVES IN BANKS TO TOTAL
MONETARY CIRCULATION

191044
191145
191245
191344
191445
191547
191646
191746

The change in these percentages for the period 1910-1917 is so slight that considering the crude character of the figures, we must interpret it as being almost negligible. The conclusion, therefore, is that practically the same percentage of the money in circulation in the United States is in bank reserves today, as has been throughout the period 1910-1917.

Growth of Bank Deposits

We are now prepared to raise the question whether a dollar in bank reserve is supporting more or less of bank deposits now than in 1913.

What has been the growth of bank deposits during the period of 1910-1917? In such an inquiry we are concerned only with the demand deposits subject to check. We may therefore eliminate the deposits of savings banks and of private banks, although a few of these deposits come under that class.⁷ Deposits of one bank in another bank may likewise be eliminated. Since these deposits are chiefly for reserve or collection purposes they may

⁷ Time deposits of commercial banks should properly be eliminated, but inasmuch as these are not separated from the demand deposits in the official figures covering the period prior to 1915, it is impracticable to separate them in our figures. Furthermore, the same legal reserve was required to be held against them by national banks prior to the inauguration of the federal reserve system as was required against demand deposits, and the reserve included in the figures previously given in this paper for commercial banks included reserves held against time deposits. Inasmuch as time deposits in commercial banks are relatively small as compared with demand deposits, and show during the few years for which we have separate figures a roughly constant ratio to demand deposits, their inclusion in the deposit figures for the entire period will not materially affect the result.

best be considered as part of the machinery of banking. Government deposits either in commercial banks or federal reserve banks should be included among the deposits representing the deposit currency of the country regardless of the fact that the law may not require a legal reserve to be held against them. They are usually payable on demand and are subject to check. Inasmuch as other annual figures have been based upon the average figures for quarterly periods, or for the dates of the comptroller's calls each year, the same policy will be followed in computing deposits. For deposits of state banks and trust companies, figures must be taken for July 1, since that date in the middle of the year is the only one for which comprehensive figures are available. Constructing the figures for deposits in the manner just explained, the following results are obtained:

TABLE 8.—GROWTH OF BANK DEPOSITS, 1910-1917

Year	Deposits in national banks ⁸		Deposits in state banks and trust companies ⁹		Government deposits in federal reserve banks ¹⁰	Total deposits	
	Amount (Millions)	Index Numbers	Amount (Millions)	Index Numbers	Amount (Millions)	Amount (Millions)	Index Numbers
1910	\$5,280	92	\$5,700	89		\$10,980	90
1911	5,430	94	6,073	94		11,503	94
1912	5,860	102	6,595	102		12,455	102
1913	6,020	104	6,658	103		12,678	104
1914	6,248	108	7,182	112		13,430	110
1915	6,912	120	7,499	116		14,411	118
1916	8,288	144	9,504	148	\$ 48	17,840	147
1917	9,923	172	11,194	174	156	21,273	174

These figures show a very pronounced growth in bank deposits since 1913, and that growth is roughly the same for the national banks, and for state banks and trust companies combined. For

⁸ Average for dates of five or six comptroller's calls each year.

⁹ Computed from figures published each year by the Comptroller of the Currency and referring to a date about June 30.

¹⁰ Figures are averages for the government deposits on the approximate dates of the comptroller's calls for national banks each year so as to correspond as nearly as possible with the figures for deposits of national banks given in the first column.

the period 1913-1917, the increase is 65 per cent for national bank deposits, 68 per cent for state bank and trust company deposits, and 68 per cent for the combined deposits of national banks, state banks, trust companies, and the government deposits of federal reserve banks. Total cash reserves of banks, it will be recalled, increased 51 per cent between 1913 and 1917. Bank deposits having grown therefore more rapidly than bank reserves, it follows that each dollar of reserve money is now supporting a larger superstructure of bank deposits than before. This fact will appear from the following table, based upon the figures given in Tables 6 and 8:

TABLE 9.—PERCENTAGE OF CASH RESERVE TO TOTAL DEPOSITS

Year	Percentage
1910	12.5
1911	12.6
1912	12.0
1913	11.7
1914	11.7
1915	11.9
1916	10.7
1917	10.6

The average percentage of cash reserve to deposits is therefore about 1 point lower than it was just before the war, and nearly 2 points lower than it was in the year 1910. Measured percentage-wise the decline since 1913 is 9.4.

Bank Clearings

Another kind of information that will afford some evidence concerning the growth of our deposit currency circulation in recent years is the statistics of checks passing through the clearing houses of the country. For the period in question this is not as trustworthy an index as it usually is because of the fact that the establishment of the federal reserve clearing and collection system has diverted many checks from the clearing channels through which they otherwise would have gone. Clearing figures as an index of deposit currency circulation are therefore not strictly comparable for years prior to the development of the federal reserve clearing and collection system and years since that development. It may be worth while, however, as a sidelight on the subject, to glance at the testimony of the clearings without placing much dependence upon it. The figures for the total clearings of the country and the figures for the total clearings for the country outside of New York City are given separately.

TABLE 10.—BANK CLEARINGS OF UNITED STATES

Year	Total clearings		Clearings outside of New York City	
	Amount (<i>Billions</i>)	Index numbers	Amount (<i>Billions</i>)	Index numbers
1910	\$164	100	\$66.8	94
1911	160	97	67.9	96
1912	174	106	73.2	103
1913	170	103	75.2	106
1914	155	94	72.2	102
1915	188	114	77.3	109
1916	262	159	102.3	144
1917	307	186	129.5	182

In view of the large and increasing proportion of checks that have been handled during the last two years directly through the federal reserve clearing system, many of which do not pass through a clearing house at all, probably the above figures for the years 1915-1917 considerably understate rather than overstate the growth of deposit currency circulation. For the period 1913-1917 the total clearings increased 81 per cent, and those outside of New York City increased 72 per cent. Total deposits in the same time, we have seen, showed an increase of 68 per cent—an estimate of growth of deposit currency which would seem to be very conservative in the light of the evidence from the clearings.

We have now considered the evidence as to the growth of business in recent years and have attempted to measure the growth of the principal elements in the country's supply of circulating media. Before considering the evidence as to the movement of prices, let us bring together the results of the study so far made, and see what evidence they afford with regard to the subject of inflation.

Our index number of the growth of business showed that from 1913 to 1917 business increased 21 per cent.¹¹ During the same period the amount of money in circulation increased 45 per cent, and the country's supply of gold money outside of federal treasury vaults increased 76 per cent. Although the proportion of the country's total money supply (exclusive of that held in federal treasury vaults) which was outside of bank reserves, and therefore in active hand to hand circulation, declined slightly from 1913 to 1917, namely from 56 per cent to 54 per cent, the abso-

¹¹ Twenty-one per cent is the figure if one excludes the index item for shares sold on the New York stock exchange, and 26 is the figure if one includes that item.

lute amount outside of banks increased 40 per cent. If all exchanges were effected by means of money, and if money were no more and no less efficient in 1917 than in 1913, an increase of 40 per cent in the money supply accompanied by an increase of only 21 per cent in the physical amount of business done would represent inflation, and find expression in higher prices.

At this particular time, however, there are reasons to believe that the dollar in active circulation was becoming more efficient. This was the period of the revision of our federal banking system, and the inauguration of the federal reserve system. Certain features of that revision have enabled the average dollar in active circulation to do more money work than formerly. For example, the creation of the gold settlement fund has made possible transfers of many millions of dollars by means of book credits that would otherwise have required the shipment of currency from one federal reserve district of the country to another, and has therefore reduced the average amount of money tied up in transit. The establishment of twelve federal reserve banks, each with the privilege of note issue, and the establishment of a number of federal reserve branch banks, have brought sources of new currency supply nearer at hand in many sections of the country than ever before, and this has also reduced the necessity of currency shipment and has lessened the average distance of such shipments as are made. This result has been further promoted by the creation of the federal reserve clearing and collection system. There is little reason to doubt, therefore, that the average dollar in active circulation in the United States does its work more efficiently today than it did before the war. To increase the efficiency of the dollar in active exchange work is to increase the currency supply as truly as to increase the number of dollars. We may conclude, therefore, with reference to the money of active hand to hand circulation, namely the proportion of our total money supply that is normally outside of bank vaults, that since 1913 its supply has increased 40 per cent, as contrasted with an increase of 21 per cent in the physical volume of the country's business, and that the average dollar is probably more efficient today than it was in 1913. This conclusion points to inflation.

Much more important from the standpoint of inflation than the money in active hand to hand circulation is that in banks which serves as the cash basis of our vast deposit or check currency. To what conclusions do our statistical inquiries lead upon that

subject? In the first place, we may note that a slightly larger proportion of the total money of the country (outside of the federal treasury) is held in bank reserves against deposits now than in 1913, the proportion having increased from 44 per cent to 46 per cent. It is in bank reserves that money finds its most efficient use. In the second place, it is to be noted that the amount of money held in bank reserves against deposits has increased enormously since 1913. For that year the average amount was \$1,488,000,000, while for 1917 it was \$2,254,000,000, an increase of 51 per cent as contrasted with 21 per cent in the physical volume of the country's business. Not only has the amount of reserve money greatly increased since 1913, but each dollar in reserve is carrying a greater burden of deposits than it was prior to the war. In 1913 the average cash reserve to deposits for the entire country was 11.7 per cent and in 1917 it was 10.6 per cent. In other words, in 1913, 11.7 cents provided the cash support for a dollar of check deposits, while in 1917, 10.6 cents supported the same load. The last item alone represents an increased efficiency of the dollar, acting as reserve money, of 9.4 per cent.

It is probable that the efficiency of bank deposits themselves circulating through the instrumentality of checks has also increased since 1913 under the "speeding up" pressure of war needs, but on that point the available evidence is inadequate to justify a very positive judgment. Pointing in the direction of greater deposit currency efficiency is the fact that in 1913 the entire clearings of the country's clearing houses were 13.4 times the average bank deposit, while in 1917 they were 14.4 times that figure. If one excludes New York clearings, the respective figures are 5.9 and 6.1.¹²

The evidence therefore shows that a slightly larger proportion of the money of the country was in bank reserve in 1917 than in 1913, that the amount of cash in reserve increased much more rapidly than the business of the country during that period, and that each dollar in reserve provided the cash basis for a larger amount of deposits in 1917 than in 1913. Furthermore, the evidence makes it appear probable that the average bank deposit had a higher rate of turnover in 1917 than in 1913, or, in other words,

¹² In this connection the fact previously noted (p. 257) should be remembered: that between 1913 and 1917 there was a large diversion of checks from the regular clearing house channels to direct clearings through the federal reserve banks—a fact which would make the above figures for 1917 appear to be an understatement.

that a larger amount of check business was done in 1917 than in 1913 for each dollar of average daily deposit. Each of these conclusions points to inflation.

The results shown from the above statistics concerning bank reserves and deposits are not surprising when one recalls the great changes in our banking machinery which the Federal Reserve act with its amendment has wrought. In 1913 national banks in central reserve cities were required to keep cash reserve against deposits of 25 per cent. They are now not required by the law to keep any cash reserve whatever, although of course they do keep such an amount of cash on hand as they need for till money. The new law requires them to keep at their district federal reserve bank 13 per cent reserve against demand deposits, and 3 per cent against time deposits, and the federal reserve banks in turn are legally required to keep 35 per cent against deposits of bankers' reserve balances, although as a matter of fact they have always kept a larger percentage. The excess, however, in recent years has been a declining one. Thirty-five per cent of 13 per cent is 4.55 per cent legal cash reserve, as compared with 25 per cent in 1913.¹³

Similar reductions in legal reserve requirements were made for banks in reserve cities, where the change in legal minimum *cash* reserve was reduced from 15.62 per cent to 3.50 per cent, and in country banks where the reduction was from 7.40 per cent to 2.45 per cent.¹⁴

The great reduction in legal reserve requirements demanded by the Federal Reserve act was due to the fact that the country's commercial paper was made more liquid by that act, both through the rediscount privilege provided by the federal reserve banks, and through the development of an open competitive market for commercial paper. Banks no longer need to maintain large cash reserves, which are often comparatively idle, in order to be

¹³ These figures are subject to some qualifications. The present legal reserve requirement as compared with the old one is still further reduced when one allows for the fact that the full legal reserve was formerly required for time deposits, as well as demand deposits, in national banks, whereas now only 3 per cent is required against time deposits. On the other hand, transit items or items in float can no longer be counted as reserve money, nor can the 5 per cent Redemption Fund held at Washington for national bank notes.

¹⁴ It is here assumed that the country banks deposited 3/5 of their reserve in the reserve city banks, and that the reserve city banks deposited 1/2 of their reserve in the central reserve city banks.

able to carry the peaks of the load. They have a ready recourse for funds at the federal reserve banks in time of need. The federal reserve banks in turn have the power to meet sudden calls for funds through the issuance of federal reserve notes, or through the reduction, under emergency conditions, of their cash reserve below the normal legal minimum.

All this has greatly improved our banking system. It has made our cash reserves much more efficient than before; but in making them more efficient it has enabled a given amount of cash in reserve to do more work than before, and has therefore made money cheaper as compared with goods. In other words, it has caused inflation.

In this connection it is well to emphasize a fact often overlooked, that almost any improvement in a country's currency and banking system, unless offset by a contemporaneous increase in the physical volume of business, causes inflation. Improvement usually means greater efficiency in the machinery of exchange. If, for example, five billion dollars are needed by a country for its hand to hand circulation and its bank reserves, to do its exchange work and maintain its price level in equilibrium with the price levels of other countries with which it carries on trade, and if the currency and banking system of that country is now greatly improved in its efficiency, improved so much that four billion dollars will now do the work formerly done by five billion and do it equally well, then one billion dollars becomes relatively redundant as compared with other countries. This makes itself felt in temporarily lower call-money rates and discount rates on short-time paper, in higher prices of speculative securities and speculative commodities, and in unfavorable exchange rates on foreign countries. This is inflation. The excess currency, however, in normal times soon finds its way out of the country through the exportation of gold, for which the country receives the equivalent in other goods and in securities. The gold so released acts like new gold coming from the mines, and is apportioned throughout the world, bringing about a new and slightly higher world equilibrium of prices. For the country improving the efficiency of its banking system, the change has been a profitable one. It is using a less expensive exchange mechanism than before, and the work is done equally well. The unnecessary part of the old mechanism it has swapped for a little less than a billion dollars' worth of other goods that it needs. A temporary currency inflation was a necessary step in the procedure.

What would have happened, however, had there been an embargo just at that time, preventing the redundant gold from leaving the country? In such a case obviously the currency supply would have been kept at an abnormally high level. It would have been dammed up within the country. The level of prices would have risen, just as the level of a lake rises when the flow of water at the inlet increases, and the outlet is dammed up so that only a small quantity flows out. This is essentially what has happened in the United States. At the beginning of the war, we were big exporters of supplies to belligerent countries, and, on net balance, despite our large purchases of American securities from abroad, we had large sums due us. Hence the tremendous net importations of gold that this country has witnessed in recent years—importations which together with our home production have increased our circulation of gold money from about 1.6 billion dollars in 1913 to 2.9 billion in 1917. Our gold embargo¹⁵ has for some time prevented this gold from leaving the country in any considerable quantities and from going to those countries with which our exchange rates were unfavorable. To demand gold from the banks or the treasury, or to use it in circulation is now generally looked upon as an unpatriotic act. Every effort has been made in the United States, as in other belligerent countries, to impound the gold as far as possible in the vaults of the central banks where, to meet war emergencies, it may serve as a basis for the maximum amount of credit—bank notes and deposits. There is little incentive for a corporation or an individual to have gold coin in his possession. He cannot export it, and to spend it or have it in his pocket or till is to brand himself as unpatriotic.

Meanwhile all kinds of money, and deposits in solvent banks are at par with gold, but gold, and with it all other kinds of money, has been rapidly losing its purchasing power over commodities.

Prices

Let us now examine briefly the evidence with regard to price movements. There exist in the United States a number of index numbers of prices, which are familiar to the readers of this article.

¹⁵ The embargo was laid by a proclamation of President Wilson dated September 7, 1917. Under its provisions the exportation of coin, bullion, or currency from the United States was prohibited, except when specifically licensed by the Federal Reserve Board with the approval of the Secretary of the Treasury. Since that date gold exports from the United States have been very small, and the privilege of exportation has been jealously guarded. See *Federal Reserve Bulletin*, Oct. 1, 1917, pp. 736-739.

All of these price index numbers tell essentially the same story. The most comprehensive of them, in the field of prices covered, embracing as it does prices for about 292 commodities, and the one that is constructed upon the most scientific lines, is that of the Federal Bureau of Labor Statistics, and we shall therefore confine ourselves to the evidence afforded by this index number. Inasmuch as our previous figures have been constructed as far as possible on the basis of average conditions throughout the year, instead of for conditions on any one date each year, we shall use here average monthly price figures, except where otherwise designated. Adjusting the index numbers of the Bureau of Labor Statistics to the basis of the average for the five years 1910-1914 as 100, so as to make them comparable with our other figures, we arrive at the following result for the wholesale prices of all 292 commodities.

Year	Index Number
1910	99
1911	97
1912	101
1913	102
1914	101
1915	102
1916	125
1917	178

This shows an increase of 75 per cent from 1913 to 1917.¹⁶ An analysis of the figures shows that a substantial rise in prices took place in all kinds of commodities. Taking the nine groups of commodities into which the Bureau of Labor Statistics classifies the 292 commodities covered by its index number, we find that the average index number of 1917 increased over that for 1913 for the respective groups of commodities in the following percentage: farm products 88 per cent; food, etc. 77 per cent; cloth and clothing 81 per cent; fuel and lighting 69 per cent; metals and metal products 108 per cent; lumber and building materials 24 per cent; drugs and chemicals 85 per cent; house furnishing goods 55 per cent; and miscellaneous goods 53 per cent.

¹⁶ Comparing this figure with the figures for the other index numbers, we find the following result. From July, 1914, the month before the war broke out, to December, 1917, the *Annalist* index numbers showed an increase of 93 per cent, the Bradstreet index numbers an increase of 103 per cent, the Dun index numbers an increase of 84 per cent, and the Gibson index numbers an increase of 106.

Viewing the situation from another angle, and comparing individual prices for December, 1917, with those for July, 1914, we find that of the thirteen items of animal products covered by the Bureau of Labor Statistics figures every one increased decidedly in price during that period, the increases varying from 37 per cent to 158 per cent. For vegetable products, eleven in number, the price rose decidedly for all but one (potatoes) where there was a decline of 10 per cent for the dates mentioned. Of the other ten items, the smallest increase registered was 46 per cent, and the largest 233 per cent. Of the thirteen items classified under textiles and leather goods, every one increased decidedly in price, the smallest increase for any item being 51 per cent and the largest 208 per cent. For the fourteen items of mineral products, every one likewise increased decidedly in price, the smallest increase being 17 per cent, and the largest one being 200 per cent.¹⁷

The index number for the retail prices of food in the United States prepared by the Bureau of Labor Statistics shows an average increase from 1913 to 1917 of 46 per cent.

There is ample proof, therefore, of a very great rise in prices since 1913, and that this rise has affected all classes of commodities, although it has naturally affected different classes of commodities and different commodities within each class differently, because each commodity has its own peculiar conditions of production and demand. The advance has naturally been greatest for those items upon which the war demand has been most concentrated.

There is some evidence that the prices of real estate have fallen in recent years on the whole, although the real estate market has not been a very active one, and we have no price statistics concerning it that are comprehensive and reliable. There is no standard unit of real estate. During the last few years, it is well known, prices of securities such as stocks and bonds have likewise fallen decidedly, on the average. Real estate and securities, however, are durable income bearers which yield their income usually over long periods of time. Their value therefore is to a large extent the capitalization of their prospective incomes at the current and prospective rates of interest. The period in question has been one in which interest rates on long-time obligations have risen very decidedly, and it is therefore natural that permanent

¹⁷ For details of these figures see Bureau of Labor Statistics, *Monthly Review*, February 1918, page 104.

income-bearers, like land and securities, should have their capital value greatly reduced, except in the cases of stocks where the dividends have increased more than enough to offset the decline in value that would otherwise have resulted from the advance in the current market rate of interest. In these cases, it may be said that the yardstick of value in terms of which future incomes are measured has been shortened in length, but that contemporaneously the interest rate has risen, or, in other words, the present relative importance of the right to a given future income as compared with a present one of the same size has declined.

Wages, which are but one kind of prices, have also risen since 1913; but, as is usually the case in times of a rapid rise in the price level, wages have risen much less rapidly. In a few special occupations, as for example those connected with the manufacture of war munitions, the building of cantonments, and the like, wages have risen more rapidly than prices, but in the main their advance has been much less pronounced. Through the courtesy of Dr. Royal Meeker, United States Commissioner of Labor Statistics, I am enabled to give in advance of their official publication the bureau's recently compiled index numbers covering rates of wages per hour, for union labor in a large group of occupations throughout the United States. The official figures are given in column 1 of the following table, and the same figures adjusted to the basis of the average for the period 1910-1914 as 100 are given in column 2.

TABLE 12.—INDEX NUMBERS OF UNION WAGE RATES

Year	Index numbers	
	1	2
1910	105	96
1911	107	98
1912	109	100
1913	111	102
1914	114	105
1915	115	106
1916	119	109
1917	127	117

This shows an increase of 14 per cent in union wages since 1913 as compared with 75 per cent in wholesale prices and 46 per cent in the retail prices of food.

We have now examined the more important evidence as to the extent of inflation in the United States, and as to its causes, and

have found reasons for believing that there has been a very substantial inflation of the currency and circulating credit of the United States since the war broke out, but more particularly during the years 1916 and 1917, and we have seen how this inflation has found expression in a very great rise in general prices affecting all sorts of commodities. Let us now inquire in conclusion as to the benefits which accrue to the public from inflation, and as to the evils of inflation.

Results of Inflation

Inflation, whether it is brought about chiefly by the excessive issue of paper currency, like the depreciated greenbacks of our Civil War period; by a great increase in the world's production of gold, like that of the middle of the last century or of the last two decades beginning about 1896; or whether it is brought about by the substitution in active circulation of other forms of money for gold throughout a large part of the world, and the building up of an ever increasing superstructure of deposit and bank note credit upon a proportionately smaller gold base, a procedure followed in recent years in the United States, England, and Canada—inflation, however brought about, carries in its trail certain evils. Chief among the evils which are following in the trail of the present war inflation are the following.

It is placing an undue proportion of the war's financial burden upon those least able to bear it. The generally accepted principle of justice in taxation is that taxes should be imposed in accordance with ability to pay. Inflation is distributing the financial burden of the war all too often in a manner directly in conflict with this principle. It is blind and often cruel in the distribution of the war finance burden. It hits hardest those with fixed or comparatively fixed incomes—many wage-earners, a large part of the small salaried class, also widows, orphans, and educational and charitable institutions whose incomes are largely funded incomes which do not rise as the cost of living advances. In all too many cases it takes from the thrifty wage-earner and gives to the extravagant profiteerer. To millions of people throughout the United States the increase in the cost of living during the last two or three years has been cruelly unjust.

It is giving the government for its bonds a money of increasingly low purchasing power, which the government will be called upon to pay back later, interest and principle, when presumably

the price level will have fallen and the dollar will have a larger command over goods than at present. The bond buyer, in other words, is giving the government cheap money and will presumably be paid back in dearer money. To the extent that the present bondholder and his heirs are the same persons who will be called upon to pay the taxes whose proceeds will be used by the government in the future to pay the principle and interest of the bonds, there may be no harm; but to the extent that the taxpayers of the next generation are different persons from the bondholders, grave injustice will result.

Inflation creates a dangerous optimism in the financing of the war, for it lulls the public, and often the authorities themselves, into the belief that it is getting the necessary wherewithal for financing the war more fully and more easily than it really is. If we inflate our circulating media enough we can doubtless float any loan we undertake. We can secure any sum of money we set out to secure, but that does not mean we shall secure the munitions, supplies, and labor, the obtaining of which is the only purpose of the government's securing the money. The money, of course, is only a means to an end. If we fail to secure the end itself, it avails little that we have secured what we originally thought would be the means. If we set out to obtain twenty billion dollars, the sum needed to meet imperative war expenditures for a given period, assuming a given price level, and if in securing that money, we so inflate the currency as to raise the prices of the things the government wants 25 per cent, we will have "a successful loan flotation," and be able to pat ourselves on the back that everything is going well, and that more rigorous economies in consumption are no longer necessary; but we will fail in our loan, for the government will have secured only eighty-cent dollars, or, in real purchasing power, only sixteen billion dollars instead of the twenty billion dollars actually sought for. We will have deceived ourselves, and such an optimistic delusion will be an obstacle in the way of those drastic economies in consumption and that nerve-racking speeding up of production that are so urgently needed for the successful prosecution of the war.

As commonly used the word inflation is generally a word of opprobrium, and, in the minds of many people, to speak of the benefits of inflation is like speaking of the virtues of the devil; but inflation with all its evils does bring some benefits. It has already been noticed that some inflation is an almost necessary incident,

although it may be a temporary one, to any increase in efficiency in a country's currency and banking system.¹⁸ Two more positive benefits may be noted.

Inflation brings rising prices, and rising prices within limits have a stimulating effect upon industry. The influence is largely psychological, but is none the less real. This idea is an old one and although it has sometimes been disputed it is generally recognized to contain an element of truth. It carries less weight, however, under existing war conditions than it would normally. At present many industries need to be stimulated but many others need to be suppressed. Rising prices stimulate industry indiscriminately—the nonessential industry as well as the essential—and the stimulus they give is therefore likely to do harm as well as good. Their influence works chiefly through the motive of profits, profits that are realizable because wages lag behind prices during an upward move; but times of great national emergency are times when patriotism not profits should be the dominant motive of industry.

Inflation, by causing rising commodity prices, we have seen, tends to force economies in consumption. No one doubts that at the present time the high and rising cost of living is pressing hard upon people and institutions with comparatively fixed incomes. For millions of people it has been a steam-roller to extravagances; and, unlike the excess profits tax, its pressure primarily has been exercised directly upon consumption rather than directly upon production. Inflation renders a useful service in so far as the rising prices it causes force people to reduce expenditures for luxuries in consumption goods, thereby curtailing the production of such goods and releasing labor and capital for the production of the things most essential for war purposes.

The pressure that inflation exerts is often cruel and very inequitably distributed. Probably the benefits of inflation can be obtained by methods involving less injustice—methods such as the curtailing of transportation facilities to “nonessential industries;”¹⁹ restrictions, through the instrumentality of the federal

¹⁸ See page 261.

¹⁹ Strictly speaking, industries are not essential and nonessential, but rather merely more or less essential. It is difficult to think of any industry that is not to some extent essential, while even munitions are to some extent shot away in summer resorts in shooting galleries. The differences in degree, however, are so great as to amount to differences in kind. With this understanding the terms essential and nonessential are permissible.

reserve authorities and the proposed War Finance Corporation, on loans to nonessential industries and on the flotation by such industries of new securities; the inauguration of a rationing policy; and the resort to taxes in an increasing degree as compared with bond issues as a means of securing funds. Inflation as a deliberate national policy should be tolerated only as a last resort. But the labor and capital resources of the country must be applied vigorously and to a rapidly increasing extent to the serious business of war. The public must economize, and economize rigorously. Nonessential industries must be cut to the bone. If inflation with all its cruel injustice for this generation and with its menace of injustice for succeeding generations is a necessary means to that end, then inflation must be tolerated. Economic justice to individuals in the distribution of the war burden is an important desideratum; but the nation is more than the individual, and a higher ideal than temporary justice in the distribution of economic burdens is the preservation of democracy.

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